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GIS LAYERING: AN ENHANCEMENT TOOL FOR MONITORING SEA TURTLES

by

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ABSTRACT

A geographic information system (GIS) allows for the linkage of large data sets composed of temporal, spatial, and descriptive components. Currently, our GIS contains information on sea turtle positions, shorelines, depth contours, area wide bathymetry, National Marine Fisheries Service (NMFS) statistical zones, offshore oil and gas structures, sea surface temperature, quantifiable measures of blue crab abundance, and shrimping effort. We hope to incorporate other parameters in the future such as hypoxic areas of the Gulf of Mexico, turtle and dolphin strandings, subsurface sea water temperature, water current speed and direction, salinity, wave height, and wind speed and direction.

We tracked the movements of 77 Kemp's ridley (*Lepidochelys kempii*) turtles released in 1993 and 1994 using radio, sonic, and satellite telemetry techniques and analyzed the patterns in relation to the distance offshore, depth, distribution and abundance of blue crabs, and shrimping effort. Tracking covered all seasons of the year and in some cases was coincidental with the occurrence of red tide outbreaks, hypoxia, fish kills, and dolphin kills.

We have demonstrated seasonal habitat faithfulness of juvenile Kemp's ridleys to the upper Texas and Louisiana coasts. Turtles arrive in the late spring and leave with the onset of cold fronts in fall. Kemp's ridleys were generally found in water depths less than 18 m except during winter months. Juveniles were usually found within 8 km from shore and in water less than 9 m deep and mostly along the upper Texas and Louisiana coasts. The mean distance from shore for large Kemp's (> 17 kg) was 14 km in mean water depths of 14 m. Nearshore abundance of turtles may be accounted for by the plenitude of blue crabs (a documented major food source of Kemp's) in this region. The availability of dead bycatch from shrimp vessels may be another attractant to turtles in the nearshore area. Adult-sized Kemp's ridleys have been tracked in deeper water than

juveniles and over greater distances up to 2,000 km from their release site. Mature female Kemp's have been tracked from South Padre Island, Texas to Key West, Florida; Sabine Pass, Texas to South Padre Island; and from Calcasieu Pass, Louisiana to Tampico, Mexico.

Movement of turtles tracked during the winter months was either in an offshore or southerly direction. The data also suggested that local weather systems effect turtle movement and diving behavior and that abrupt changes in water temperature may initiate turtle movements.

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